



WPS 974 .

International Economics Department
The World Bank
September 1992
WPS 974

How Minilateral Trading Arrangements May Affect the Post-Uruguay Round World

**C.A. Primo Braga
and
Alexander Yeats**

Fears about how the further spread of free trade areas will affect world trade volumes may be exaggerated — while the dangers of these blocs becoming hostile to each other may have been underestimated. “Managed” trade is a far more likely outcome.

Policy Research
WORKING PAPERS
International Trade

WPS 974

This paper — a product of the International Trade Division, International Economics Department — is part of a larger effort in the department to evaluate the influence of changes in external conditions on developing countries' trade and growth prospects. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Jean Jacobson, room S7-035, extension 33710 (September 1992, 31 pages).

One issue dominating recent discussions on free trade areas and other minilateral associations (preferential trade arrangements) is whether such arrangements will detract from further multilateral trade liberalization on a most-favored-nation basis. But for much of this debate empirical information has been lacking on:

- The global importance of minilateral arrangements that have been, or are being, concluded.
- The relative size of other major bilateral trade flows *not* affected by minilateral arrangements, and their suitability for such arrangements.
- The global importance of Europe in this process.
- The possibility that other sorts of arrangements — such as “managed” trade initiatives (arrangements specifying quantitative trade targets) — are a more likely threat as far as trade flows not presently covered by free trade area arrangements are concerned.

Braga and Yeats argue that this lack of relevant data has led to several misconceptions about the movement toward minilateralism. In

particular, their statistics suggest that fears about how the further spread of free trade areas will affect world trade volumes may be exaggerated — while the dangers of these blocs becoming hostile to each other may have been underestimated.

Using data recently compiled by the United Nations, Braga and Yeats show that the global importance of minilateral arrangements is now far greater than is often recognized. Almost half of world trade is affected by these arrangements.

But major trade flows not covered by minilateral arrangements are dominated by important country-specific problems. In particular, problems relating to high-technology trade between Asian newly industrialized countries (NICs), Japan, and the United States, as well as between Asian NICs, Japan, and Western Europe, are sufficiently important to hinder the formation of additional free trade areas. This suggests that fears about the spread of such arrangements may have been exaggerated.

Braga and Yeat's tabulations and analysis of the “discriminatory” trade barriers applied to these flows indicate that “managed” trade is a far more likely outcome.

The Policy Research Working Paper Series disseminates the findings of work under way in the Bank. An objective of the series is to get these findings out quickly, even if presentations are less than fully polished. The findings, interpretations, and conclusions in these papers do not necessarily represent official Bank policy.

Table of Contents

	<u>Page</u>
I. Introduction	1
II. Existing and Potential Arrangements	5
III. The Relative Importance of Minilateral Arrangements	7
IV. The Managed Trade Alternative	14
V. Final Comments	20
Appendix Statistics on International Trade in High Technology Products	26

List of Tables

<u>Table No.</u>		<u>Page</u>
1.	Value and Share of Merchandise World Trade Under Minilateral Arrangements	9
2.	The Relative Importance of Merchandise Trade Flows not Influenced by Regional Trade Arrangements in 1988	13
3.	Observations on Potential FTA Arrangements Between Specific Trading Partners (Unaffected trade flows over \$50 billion)	15
4.	The Incidence of Discriminatory U.S. Trade Barriers on Japan, Federal Republic of Germany, United Kingdom and French Exports, (Trade values for 1986 and trade barriers are those in place in 1990)	18
5.	Trends in United States Exports of High-Tech Products to Selected Markets: 1965 to 1989	21

Appendix Table No.

1.	The Relative Importance and Major Sources of High Tech Products in Global Trade	27
2.	The Origin and Destination of High Tech Trade in 1988	28
3.	The Twenty-Five Largest Exporters of High Tech Manufactured Goods	29
4.	The Relative Importance of Individual Products in All High Tech Global Exports	30
5.	Revealed Comparative Advantage Indices for the Twenty-Five Largest Exporters of High-Tech Manufactured Goods	31

List of Boxes

<u>Box No.</u>		<u>Page</u>
1.	GATT Rules Concerning Free Trade Areas	4
2.	"Fortress" Europe and the Disincentive for Global Negotiations	12
3.	Definitions of High Technology Industries and Trade	19

I. Introduction

Over the last few years many analysts have expressed concern over the growing dissatisfaction with multilateral trade negotiations (MTNs) as a means of achieving trade liberalization (Aho and Aronson, 1986; Patterson, 1989). One source of this dissatisfaction has been the pace of the GATT negotiations. The Tokyo Round lasted seven years, from 1973 to 1979, while the Uruguay Round started in 1986 and was scheduled for completion in 1990, but the impasse at the Brussels Ministerial Meeting in December, 1990 led to its extension -- probably for two years. In contrast, the United States-Canada free trade agreement (FTA) was completed in about 13 months and the recently signed Chile-Mexico FTA was negotiated in less than one year.¹ Second, the GATT multilateral negotiations involve very diverse interests of a large number of participating countries -- a point that greatly complicates the agenda of the MTNs (15 different negotiating groups were originally established in the Uruguay Round covering topics from services to tropical products).² A third problem concerns the GATT's de facto consensus rule which countries have used to block progress until their individual demands are met.³

* Economists, International Trade Division, World Bank, Washington, D.C. 20433. We would like to acknowledge comments and suggestions by R. Duncan, J.M. Finger, B. Kaminski, P. Meo, and V. Nehru. The usual "caveats" apply.

¹ The perception that the minilateral route is quicker than the multilateral one, however, is not undisputed. It is worth remembering for instance, that the road to the single European market began to be "carved" almost four decades ago. For a discussion of this theme, see Bhagwati (1992).

² The groups reporting to the Trade Negotiating Committee during the first four years of the Uruguay Round were the following: safeguards, dispute settlement, agriculture, tropical products, natural resource-based products, textiles and clothing, tariffs, non-tariff measures, MTN agreements and arrangements, subsidies and countervailing measures, GATT articles, functioning of the GATT system, trade related aspects of intellectual property, trade-related investment measures, and services.

³ For example, India and a few other developing countries blocked the adoption of recommendations on intellectual property rights in the Ministerial Declaration at the Montreal midterm review of the GATT negotiations in December 1988. According to Hufbauer and Schott (1985) the problem of such "footdraggers" has become more acute as GATT talks focus more on the negotiation of trading rules rather than on reciprocal trade liberalization. Schott (1989) argues that such problems would be far less important in bilateral or minilateral negotiations among "like-minded" countries.

Problems relating to the functioning of the GATT system itself have also contributed to the dissatisfaction with the MTN approach. One such set of concerns involves the nature of the GATT rules and the efficacy of its enforcement mechanisms. These criticisms often center on the deficiencies in the GATT Agreement and its numerous exceptions -- most notably in textiles and clothing -- while problems relating to agriculture and subsidies are not adequately addressed. The proliferation of so called "grey area" measures like "voluntary" export volume and price restraints, orderly marketing arrangements, or intra-industry agreements -- see GATT (1988) for the details on more than 200 such measures imposed by member countries -- that run counter to the spirit of GATT regulations has also caused increased dissatisfaction.

Given the importance attached to these problems there has been a growing interest in "minilateral arrangements" -- particularly, free trade areas -- either as an alternative or as a complement to the GATT approach.⁴ Proponents of FTAs cite the advantages of negotiating with a limited number of countries that are willing to liberalize trade bilaterally. The agenda in such negotiations can be geared to the specific interests of the participants and special administrative bodies can be established, as in the Israel and Canadian agreements with the United States, to provide a consultation and dispute settlement mechanism "for members only". Schott (1989) suggests that FTAs have also been considered as a way to achieve specific policy objectives such as managing trade deficits, reducing foreign barriers, eliminating the "free rider" problem in multilateral negotiations, balancing bilateral trade flows, or even establishing more favorable conditions for multilateral agreements. While differing

⁴ While he was US Secretary of the Treasury, James Baker stated "If possible, we hope liberalization will occur in the Uruguay Round. If not, we might be willing to explore a "market liberalization club" approach through minilateral arrangements or a series of bilateral agreements. In this fashion, North America can build steady momentum for more open and efficient markets" (Baker 1988, p. 41). It should be noted that the U.S. emphasis has been on the establishment of free trade areas and not customs unions. The latter involves two or more countries which abolish all, or nearly all, trade restrictions among themselves and set up a common and uniform barrier against outsiders. The European Community is an example of this type of arrangement. Once the arrangement expands beyond trade in goods, encompassing trade in services and the movement of factors of production, it is referred to as a common market -- e.g., the 1992 European Single Market program. In a free trade area, trade among member countries is also completely liberalized, or nearly so. But there is not a common trade barrier against nonmember countries; each country is free to impose its own trade restrictions. The European Free Trade Association EFTA is an example of this latter type of arrangement. See Box 1 for a discussion of GATT regulations concerning free trade areas. The term "minilateral arrangement" will be used in this paper as encompassing any treaty negotiated by two or more trading partners, which violates the most-favored-nation (MFN) rule. Unilateral concessions -- such as the Generalized Systems of Preferences (GSP) of industrialized countries, as well as non-reciprocal contractual preferential arrangements -- such as the Lomé Convention --, are not considered as falling under this definition.

views exist on almost all these issues the last point has been particularly contentious. Specifically, many economists -- see Wonnacott and Lutz (1989) or Bhagwati (1991) -- apparently see recent activity pertaining to FTAs as a threat to the multilateral approach since it channels liberalization efforts along alternative -- and possibly conflicting -- lines.

A somewhat surprising point is that the discussion involving the relation between FTAs and GATT's multilateral process has been marked by limited empirical analyses. In this paper we tabulate and analyze the implications of statistics on the global importance of trade which now occurs under minilateral arrangements and compare this with the major trade flows which still occur outside these arrangements. Our analysis speaks to two concerns. First, that the concerns expressed about a further spread of minilateral arrangements weakening the multilateral negotiation process are at best tardy -- these arrangements have already grown to the point that they are larger than is generally realized, i.e., they encompass trade flows which are equivalent to the ones that occur on a MFN basis. As such, we argue that the alarms now being raised are tantamount to locking the barn door after the horse has escaped. Second, we also tabulate the major bilateral trade flows that are not covered by FTAs in an attempt to determine if they are appropriate candidates for such agreements, or whether they are likely to be subject to some alternative arrangement like "managed trade."⁵ Our paper closes with an assessment of our findings for post-Uruguay Round trade relations, highlighting the issue of "high-tech" trade. Before proceeding to the empirical analyses, it should be stressed that this paper focuses on one of the major concerns often expressed about FTAs -- that the further spread of these arrangements may detract from or deter global efforts to reduce trade barriers in GATT multilateral negotiations. There are other related topics equally deserving of attention. For example, some developing countries have attempted to utilize regional arrangements to stimulate industrialization and growth -- see the annex for a listing. Such arrangements may be relatively unimportant from a global prospective, but can be of key importance for the growth prospects of the FTA member developing countries since they may have a negative impact on growth if they reduce access to more economically efficient outside suppliers.

⁵ The term managed trade is used here to characterize arrangements that specify quantitative trade targets (either for exports or imports). "Voluntary export restraints" (VERs), "orderly marketing agreements" (OMAs), "voluntary import expansion" agreements (VIEs) -- e.g., the US-Japan Semiconductor Trade Agreement -- and the "multi-fibre arrangement" (MFA) are some of the main examples in this contest. For a review of alternative definitions of managed trade see Tyson (1990) and Baldwin (1990).

Box 1GATT Rules Concerning Free Trade Areas

The cornerstone of the General Agreement on Tariffs and Trade is the nondiscrimination or most-favored-nation (MFN) principle of GATT Article I. Trade concessions awarded to one member country are to be extended to all GATT members. FTAs conflict with this principle.

In spite of this conflict, GATT rules can accommodate the promotion of trade liberalization through "closer integration between the economies of the countries party to such agreements." GATT Article XXIV permits departures from the MFN obligation provided that the FTA or customs union meets three conditions: (1) duties and other restrictive regulations are eliminated on "substantially all" trade between partner countries; (2) the general incidence of duties and regulations affecting third parties is no higher after than it was before the establishment of an agreement; and (3) the agreement contains a plan and schedule for its complete formation within a reasonable length of time. Although the intent of these rules is sometimes interpreted as meaning that an FTA should be trade-creating, there is no guarantee that this will be the case.

Since 1948, more than 60 FTAs and preferential trade agreements have been reviewed by the GATT under Article XXIV provisions (see Schott, 1989, Annex A for a list). Only four agreements -- the South African-Rhodesian Customs Union (1948); the Nicaragua-El Salvador Agreement (1951); Nicaraguan participation in the Central American Free Trade Area (1958); and the Caribbean Community and Common Market (1973) -- were declared fully compatible with Article XXIV requirements. However, no agreement has been censured by a working group as being incompatible with GATT rules. As a result of these precedents, countries are perceived to be able to derogate from MFN obligations in FTAs without regard to the effects on third countries.

This impression has been reinforced by the introduction of the 1979 Decision on Differential and More Favourable Treatment, Reciprocity and Fuller Participation of Developing Countries (also known as the Enabling Clause). As a result of this decision, regional arrangements involving only developing countries are excluded from the requirement to meet the formal criteria of Article XXIV. Regional arrangements among these countries are permitted as long as they facilitate trade, do not create "undue difficulties" for the trade of other countries, and do not act as an impediment to the reduction or elimination of trade barriers on a most-favored-nation basis. Formal procedures have not been established to ensure that these conditions are met.

A further key concern is that some FTAs, like the EEC and NAFTA, may actually turn hostile to each other and impose new forms of trade barriers.

II. Existing and Potential Arrangements

Existing GATT regulations concerning multilateral arrangements -- particularly Article XXIV whose provisions are summarized in Box 1 -- require notification and review by contracting parties of the General Agreement. Since 1948, more than 60 multilateral arrangements have been subject to this formal procedure. A compilation of these reviews prepared by Schott (1989, Annex A) provided the starting point for our analysis of global trade "affected" (see definition below) by these types of arrangements.⁶ Next, an attempt was made to include other similar arrangements that had not been subject to the GATT review process (i.e., the countries involved may not have been GATT members) and Inotai (1991) provided a useful source of information on such agreements among developing countries.⁷

To this list we added the following potential new arrangements: the North American Free Trade Agreement (NAFTA), and FTAs between Eastern European countries (including the now "defunct" Soviet Union) and developed Europe. The US-Mexico and Canada-Mexico trade flows were considered in anticipation of an agreement being ratified in the next two years -- indeed, if it were not it would be a major blow to further FTA negotiations (and the concerns about their spread would be alleviated). Arrangements between Eastern and Western Europe, in turn, have been considered since in some cases these negotiations are at an advanced stage and some form of agreement seems likely. Indeed, Poland, Czechoslovakia, and Hungary have applied for associate EEC

⁶ As mentioned before, other types of arrangements, like the GSP and the Lomé Regime, were excluded from these tabulations since they depart from the typical FTA model and only apply to one way trade, i.e., imports by the industrial countries. This exclusion will impart an upward bias to the residual amount of MFN trade in global totals.

⁷ Developing countries have experimented with inter-regional trade preferences from time-to-time. In the mid-1970s, some 16 countries exchanged mutual trade preferences under the provision of GATT's Protocol for Trade Relations Among Developing Countries. In the 1980s, more than 60 developing countries exchanged trade preferences, or established an institutional framework to do so, under the aegis of UNCTAD's Global System of Trade Preferences (GSTP) among developing countries. Several, less ambitious, attempts have also been made like the Tripartite Arrangement involving India, Egypt and Yugoslavia. Our tabulations of FTA trade excludes these arrangements, largely because of their special nature and the difficulties in getting information on the trade they affect.

membership, and special deals have been approved (e.g., with Finland) or are pending with EFTA members.⁸ Furthermore, it is worth remembering that, with reunification, the former German Democratic Republic was absorbed into the European Community -- a move that also provided duty free access for manufactured goods exported to EFTA markets.

Recent developments in Latin America such as MERCOSUR and the Chile-Mexico FTA were not explicitly accounted for in our tabulations.⁹ The MERCOSUR process is intended to lead to the creation of a common market -- encompassing Argentina, Brazil, Paraguay, and Uruguay -- by the end of 1994. The Asuncion Treaty, signed in March 1991, established this ambitious target based on the progress so far achieved in the context of the Argentine-Brazilian Integration Program initiated in 1986 (for a brief description of this program see Primo Braga (1990)). The September 1991 treaty for a Chile-Mexico FTA, in turn, established a framework for the gradual reduction of tariffs affecting bilateral trade over the next four years. Accordingly, 90 percent of the goods traded between Chile and Mexico are expected to be exchanged under duty free status by the end of 1995. A first approximation of the impact of these arrangements can, however, be inferred from our data on LAIA "affected" intra-regional trade (see Table 1).

We utilized the "affected" trade concept in our tabulations due to a lack of precision in some export and import statistics. According to this concept, all trade that occurs between countries which are parties to a minilateral arrangement is affected (normally in a positive direction) by the terms of the agreement. This simplified procedure does not allow for exclusions and differential treatment by type of good that typically exists under these

⁸ The estimate of "affected" trade flows between Eastern Europe and Developed Europe should be interpreted with care (see Table 1). It assumes that all trade between the former European COMECON member and high-income European countries would be covered by preferential arrangements. Since -- at least in the near future -- one should not expect such a broad array of FTAs, this assumption tends to introduce an upward bias in the estimate. On the other hand, it can be argued that the use of 1988 trade flows inserts a downward bias in this figure. After all, the trade potential of Eastern European countries was significantly hampered by the maze of controls which characterized their trade relations with the West at that time.

⁹ Other prospective minilateral agreements in Latin America and the Caribbean appear to be in a formative basis. For example, in January 1991 both Mexico and Venezuela announced their intention to negotiate bilateral free trade agreements with several Central American countries by 1996; Colombia, Mexico, and Venezuela have also signed in 1991 a trilateral framework for liberalization of trade and investment flows. There are also ongoing attempts to revitalize CARICOM, CACM, and the Andean Pact, although the proliferation of new minilateral arrangements is adding to the stress of the "old" initiatives -- particularly, the Andean Pact.

agreements. For example, some products -- like wood shingles exported from Canada to the United States -- are excluded from the Canadian-United States FTA. Similarly, some developing country arrangements (like ASEAN or LAIA) allow for preferential tariffs below MFN rates instead of duty free trade. Also, the degree of product coverage varies significantly among different agreements -- e.g., only 40 percent of intra-regional trade among LAIA members was conducted under preferential terms by 1988.¹⁰

Data required for measuring the importance of the existing arrangements were drawn from three different sources. UNCTAD (1990, Appendix Table A1) estimated total world exports for 1988 and other years (as well as trade in broad classes of goods like manufactures or energy products) and these figures formed the base for our analysis. This source also provided detailed data on major trade flows such as the intra-trade of EFTA and EEC countries, trade between Europe and Japan, Japan and North America, etc. which greatly assisted our tabulations of "affected" and non-affected trade. Second, Inotai (1991) compiled data on intra-trade among developing countries' existing regional arrangements. In situations where required data were not available from either of these two sources (such as trade under the United States-Israel FTA) it was compiled directly by the authors from United Nations Series D Trade Tapes.¹¹

III. The Relative Importance of Minilateral Arrangements

Employing these three statistical sources, Table 1 tabulates information on the relative importance of exports that occur under existing minilateral arrangements. The table shows the actual total value of 1988 "affected" trade that occurs within the framework of these arrangements and each specific flow's share of world trade. Similar statistics are given for (i) all non-energy goods (i.e., excluding SITC 3) and (ii) manufactures. To

¹⁰ It is worth emphasizing, however, that if MERCOSUR and other planned FTA initiatives -- such as the Chile-Mexico FTA -- evolve as planned, they will significantly increase the proportion of intra-regional trade in Latin America which is exchanged under preferential terms.

¹¹ There are some inconsistencies between the data sources employed in these tabulations, but it is anticipated that their overall effects are relatively small. Inotai employed IMF (DOT) and OECD statistics for his tabulations and these data may differ from United Nations trade statistics. See Rozanski and Yeats (1992) for a detailed analysis of the importance of these differences. Data published in UNCTAD (1990) are based on United Nations trade data.

assist in evaluating this information, separate sub-totals are shown for arrangements involving mainly OECD countries, developing countries, and Eastern Europe.

Perhaps the key point evident from the data in Table 1 concerns the relative importance of European integration efforts when viewed from a global perspective. The preferential trade of developed (Western) Europe currently accounts for about \$0.9 trillion which is 31 percent of world trade, or about 34 percent of global manufactures trade.¹² Another interesting point is how the established European arrangements (excluding Eastern Europe) dwarf current efforts to form a North American free trade area. At \$195 billion the intra-trade of countries trying to conclude NAFTA (Mexico, Canada and the United States) is less than one-quarter that of Europe. From a global perspective, arrangements between developing countries are seen to be minuscule - they account for about three percent of world exports.

Overall, the completed arrangements listed in Table 1 encompassed more than 40 percent of world exports in 1988 and if we include the potential new arrangements, the share of "affected" world trade would be as high as 46 percent (and approximately 50 percent for trade in manufactures). As such, the clear message is that, while the further spread of regional integration efforts may threaten the multilateral negotiations process, a more imposing threat appears to be the relative size that these arrangements have already achieved and the fact that they could turn hostile to each other. A further point to consider is that these established arrangements provide an important disincentive for members to engage in multilateral negotiations which would lower the preference margins they receive in each other's markets. (see Box 2).

Eastern European preferential trade arrangements, which existed until the collapse of COMECON (council for Mutual Economic Assistance) in 1991, are also reported as a memo item in Table 1. It is worth

¹² A point often missed is that a special protocol between the EC and EFTA allows duty free trade in manufactured goods between members of these two blocks. Trade in some agricultural goods also occurs on a preferential basis between EC and EFTA countries. The data in Table 1 have been prepared to reflect these intra-European arrangements. It is also worth mentioning that there is currently a draft treaty proposing the establishment of an European Economic Area. Under this treaty a number of single market rules would be extended to EFTA countries. See Box 2 for a description of some of the major disincentives that preferential intra-regional trade creates for European countries to participate in multilateral negotiations.

Table 1: Value and Share of Merchandise World Trade Under Minilateral Arrangements

	Share of 1988 Trade (%)			Value of 1988 Trade (\$million)		
	All Items	All Non-Oil Goods	All Manufactures	All Items	All Non-oil Goods	All Manufactures
TOTAL WORLD EXPORTS	100.00	100.00	100.00	2,829,098	2,562,252	1,980,066
OECD RELATED ARRANGEMENTS	38.66	40.62	42.06	1,093,644	1,040,692	832,759
Intra/trade of Dev. Europe	30.52	32.30	34.02	863,405	827,715	673,702
United States and Canada	5.32	5.49	5.20	150,391	140,562	103,028
EEC Regional Arrangements	2.05	1.98	1.96	57,976	50,853	38,803
EFTA and Turkey (a)	0.46	0.51	0.54	12,985	12,952	10,625
United States and Israel	0.19	0.21	0.24	5,507	5,449	4,730
Australia and New Zealand	0.10	0.10	0.08	2,795	2,646	1,612
Australia and Papua New Guinea	0.02	0.02	0.01	585	515	259
DEVELOPING COUNTRY ARRANGEMENTS	2.74	3.13	3.13	77,619	80,320	61,918
Hong Kong-China	1.27	1.40	1.64	36,012	35,995	32,427
ASEAN	0.80	1.06	0.95	22,648	27,191	18,783
LAIA	0.37	0.40	0.32	10,562	10,149	6,376
Gulf Cooperation Council	0.16	0.16	0.13	4,650	4,170	2,560
Economic Community West Africa	0.05	0.04	0.03	1,513	953	650
Central American Common Market	0.02	0.02	0.02	570	567	422
SADCC	0.02	0.01	0.01	537	375	210
Mahgreb	0.02	0.02	0.01	517	440	200
CARICOM	0.02	0.01	0.01	426	320	170
UDEAC	0.01	0.01	0.01	184	160	120
TOTAL TRADE FLOWS UNDER MINILATERAL ARRANGEMENTS	41.40	43.75	45.18	1,171,263	1,121,012	894,677
POTENTIAL NEW ARRANGEMENTS	4.42	4.11	4.07	124,911	105,338	80,666
United States and Mexico	1.54	1.54	1.56	43,460	39,449	30,934
Canada and Mexico	0.05	0.05	0.05	1,439	1,388	1,002
Eastern Europe and Dev. Europe	2.83	2.52	2.46	80,012	64,501	48,730
TRADE FLOWS UNDER POTENTIAL AND EXISTING ARRANGEMENTS	45.82	47.86	49.26	1,296,174	1,226,350	975,343
Memo Item: Collapsed Arrangements	4.87	4.16	3.67	137,879	106,644	72,749
Eastern Europe Intra-Trade	4.47	3.78	3.45	126,459	96,775	68,357
Eastern Europe and Cuba	0.40	0.39	0.22	11,420	9,869	4,392

* Turkey and EFTA signed a free trade agreement in October 1991. This arrangement was expected to come into force in April 1992.

Notes: Data compiled from UNCTAD (1989 and 1990) and Inotai (1991) with some statistics drawn directly from the United Nations COMTRADE data base. Developed Europe and Cuba were reporters in the COMTRADE base and are the sources for Eastern European data on these trade flows. For some of the developing country arrangements (SADCC, UDEA, etc.) manufactures and non-oil trade values were estimated by applying the share of these goods in a previous year to the 1988 trade totals. The 1976 Bangkok agreement (Bangladesh, India, Republic of Korea, Sri Lanka and Laos) was not included because at present only 3 percent of the members' intra-trade is exchanged under tariff preferences. The above tabulation consider the exchange of goods between EEC member states to constitute international trade. If the EEC were assume to be single unit, the global share of merchandise trade under existing and potential FTAs would be about 31 percent.

mentioning that several of the former socialist economies are negotiating new FTAs among themselves (e.g., Poland, Czechoslovakia and Hungary) and/or with other countries (besides those in Developed Europe).¹³

Table 2 provides additional information relating to the point that the threat from the further spread of regional arrangements may have been exaggerated (and the actual importance of established arrangements overlooked). The table identifies major bilateral trade flows not currently affected by existing arrangements (i.e., North America-Japan, North America-Developed Western Europe, Japan-Developed Western Europe, etc.) and also indicates the 1988 value and global share of this exchange. Similar tabulations are also shown for trade in: (1) all non-energy goods and (2) manufactures. As indicated, the 13 major "unaffected" trade flows listed in Table 2 (excluding developing countries' inter-regional trade) account for 38 percent of world trade, but the first five flows listed are of key importance as they comprise over two-thirds of this total. Clearly, if one is to examine implications of the further spread of regional arrangements for global negotiations and trading conditions these are the flows upon which one should focus attention given their importance in world trade.

Our individual analysis of these bilateral flows (see Table 3) suggests that, unless there are radical and unexpected developments, it is unlikely that FTA arrangements could be concluded among the involved countries. For example, approximately \$200 billion, or almost one-sixth of global unaffected trade, occurs between North America and Western Europe. Disputes between the main trade actors (the United States and the European Community) in these regions have been the main obstacles for a successful conclusion of the Uruguay Round and it is difficult to see how the points of contention (such as those relating to agricultural trade policy issues) could be more easily resolved in an FTA as opposed to MTN negotiations (similar objections occur on other trade flows -- like Australia/New Zealand and the EEC). North America-Japan, and Japan-Western Europe, account for a further one-fifth of the unaffected trade flows and it is again difficult to see how bilateral FTA deals could be cut here. In both markets Japan has been the objective of important discriminatory trade barriers (like VRS or antidumping duties -- see Laird and Yeats, 1991 for details) and the sense that Japan does not "play by the rules" has produced

¹³ The Black Sea Economic Cooperation Zone (BSECZ), for instance, intends to eliminate intra-regional trade restrictions. Originally conceived in 1990, the BSECZ has been enlarged to accommodate several new states born from the disintegration of the Soviet Union. Its membership now includes: Albania, Armenia, Azerbaijan, Bulgaria, Georgia, Greece, Moldova, Romania, Russia, Turkey, and Ukraine.

some rather strident calls for further protective measures. In these cases "managed trade" appears to be a more likely outcome than a FTA arrangement (see section IV which follows for a discussion of this point).

The possibility of a minilateral arrangement between Japan and other Asian countries, in turn, cannot be dismissed as easily. Actually, there have been recent proposals -- e.g., the concept of an East Asia Economic Group advanced by the Malaysian Prime Minister -- supporting such an idea. We believe, however, that the export orientation of the Asian economies tends to inhibit the attractiveness of any proposal which would entail explicit discrimination against outsiders -- particularly, the U.S. (see Table 3).

Among the potential FTA arrangements falling below the US\$ 50 billion "cut-off" used for Table 3, there is -- at least at the level of political rhetoric -- one that has already begun to be implemented: an FTA between the United States and Latin American countries as suggested by the Enterprise for the Americas Initiative. It seems, however, that significant negotiations will only occur after the conclusion of the NAFTA negotiations and even then there are important obstacles to its implementation. The main one hinges on differences in the levels and character of protection between these countries; these differences often vary directly with levels of development. For example, Erzan and Yeats (1991) found that less than 10 percent of exports from Bolivia, Chile, Ecuador, Peru or Venezuela to the United States faced tariffs greater than 5 percent and, with the exception of the MFA and some agricultural products, few nontariff barriers were encountered.¹⁴ In contrast, U.S. exports to Latin America face tariffs that average 15 to 50 percent in different countries and a large number of nontariff measures. This evidence suggests that there would be implementation difficulties since FTA gains from a mercantilism perspective would be skewed toward the United States -- the country facing the highest trade barriers.¹⁵ Similar conclusions apply

¹⁴ Many tariffs of less than 5 percent resulted from general across-the-board tariff cutting procedures applied in previous MTNs and it is often suggested that they have insignificant trade effects. In fact, one proposal in the current multilateral negotiations termed them "nuisance tariffs" and suggested they be dropped automatically. The relatively low tariff barriers facing Latin American exports to the U.S. are due to several factors: tariff reductions negotiated in previous MTNs; existing preference schemes like the GSP or CBI; and the concentration of some countries' exports on raw materials that have traditionally faced zero or low trade barriers. The Asian NICs would have a much higher incentive to explore FTA arrangements due to the more restrictive barriers they often face.

¹⁵ It can be argued that this danger will be minimized by the U.S. negotiating strategy for the EAI, which seems to stress the need for Latin American and Caribbean countries to implement significant structural reforms (including trade liberalization) before embarking on FTA negotiations with the U.S. In any case, an FTA in the Western Hemisphere will not be put in place in the near future. For further details on Latin American and Caribbean countries reactions to the EAI, see Primo Braga (1992).

Box 2"Fortress" Europe and the Disincentive for Global Negotiations

A key point that is often not adequately recognized is that FTAs create a disincentive to engage in global trade negotiations. Also, as a general rule, the more important (globally) the FTA, the stronger will be the disincentive. Since our tabulations (Table 1) show that FTAs (or related arrangements) now cover approximately one-half of global trade it is important to understand the nature of this force working against multilateral negotiations. Institutional arrangements in Europe provide a useful example.

Three key arrangements influence the intra-trade of industrial Europe:

1. Under the terms of the EC convention trade between member countries is barrier free -- while nonmember countries exporting to the Community face tariffs and, frequently, nontariff barriers.
2. Similarly, EFTA provides for duty free trade among its members. Outside exporters to EFTA face the tariff and NTBs of the individual importing country -- a common tariff does not exist as in the case of the EC.
3. A special EC-EFTA protocol allows duty free trade in manufactures between the two blocks and also extends favorable terms to some agricultural goods.

As a result, intra-European trade occurs under very favorable terms. Sweden can now export shoes to Denmark under a tariff preference of 25 to 30 percent. Finland has textile and clothing exports to Norway (thanks to the protective umbrella of 25 to 50 percent tariffs and NTBs on outsiders), while Greece exports wheat to Germany thanks to variable import levies that have been estimated at several hundred percent on Argentina, Canada, Australia, the United States and other "efficient" producers.

Now, what would happen to this intra-trade if the European margins of preference were eroded through trade barrier reductions negotiated in MTNs. Clearly, some trade -- like Swedish shoes or Finish clothing - - would be largely eliminated as domestic producers would be placed on an equal footing with more efficient outside suppliers. In other cases, trade flows, profits, and employment in industries that now enjoy major intra-European preferences would be sharply lower due to their greater exposure to outside competition. In short, the industries, workers and politicians that would be adversely affected by such new competition probably feel they have a major stake in seeing that EC-EFTA external trade barriers are not lowered in any multilateral negotiating process. Major European losers -- like consumers who pay highly inflated prices due to protection -- generally are not adequately informed about the added costs they bear and are not a very effective political force for reducing trade barriers.

Table 2. The Relative Importance of Merchandise Trade Flows not Influenced by Regional Trade Arrangements in 1988

<u>Trade Flow</u>	<u>Share of 1988 World Trade (%)</u>			<u>Value of 1988 Trade (\$million)</u>		
	<u>All Items</u>	<u>All Non-oil Goods</u>	<u>All Manufactures</u>	<u>All Items</u>	<u>All Non-oil Goods</u>	<u>All Manufactures</u>
TOTAL WORLD EXPORTS	100.00	100.00	100.00	2,829,098	2,562,252	1,980,066
<u>Existing and Potential FTA Trade Listed in Table 1</u>	<u>45.82</u>	<u>47.86</u>	<u>49.26</u>	<u>1,296,174</u>	<u>1,226,350</u>	<u>975,343</u>
<u>Collapsed Arrangements</u>	<u>4.87</u>	<u>4.16</u>	<u>3.67</u>	<u>137,879</u>	<u>106,644</u>	<u>72,749</u>
<u>Major Non-Preferential Trade Flows</u>	<u>38.29</u>	<u>38.94</u>	<u>41.72</u>	<u>1,083,405</u>	<u>997,946</u>	<u>826,163</u>
North America - Developed Europe	7.14	7.56	8.31	202,105	193,717	164,561
North America - Japan	4.94	5.35	5.90	139,846	137,091	116,890
North America - Developing South and SE Asia	4.77	5.12	5.82	134,999	131,9	115,152
Japan- Developing South Asia	3.96	3.98	4.73	112,134	102,04	93,683
Developed Europe - Developing South and SE Asia	3.46	3.52	4.47	97,856	90,303	88,498
Japan- Developed Europe	2.84	3.12	3.92	80,206	80,040	77,712
Developed Europe- Developing West Asia	2.00	1.69	1.85	56,460	43,388	36,702
Developed Europe - Developing Africa	2.44	2.04	1.81	68,935	52,271	35,795
Developed Europe - Developing America	1.86	1.92	1.39	52,729	49,126	27,465
Eastern Europe - Developing Countries	2.01	1.86	1.37	56,727	47,769	27,214
North America - Developing America ¹	1.62	1.47	1.21	46,014	37,587	23,906
Australia/New Zealand - Developed Europe	0.61	0.64	0.52	17,216	16,510	10,238
Japan-Australia/New Zealand	0.64	0.63	0.42	18,178	16,134	8,347
<u>Intra-Regional Developing Country Trade²</u>	<u>2.03</u>	<u>1.16</u>	<u>1.17</u>	<u>57,509</u>	<u>29,830</u>	<u>23,079</u>
Total of Bilateral Flows Listed Above	88.98	90.96	94.65	2,517,458	2,330,940	1,874,255

¹ Excludes CBI(Caribbean Basin Initiative) and CRIBCAN (Canada's Preferential Trade Scheme for the Commonwealth Caribbean).

² Although a preferential trade framework among developing countries exists under UNCTAD's Global System of Trade Preferences (GSTP) this system has, thus far, been little utilized.

Note: For convenience, regional groupings adopted were those employed by the Statistical Office of the United Nations. See UNCTAD (1990).

to trade flows between other developing and industrial countries (Erzan and Svedberg (1989), for instance, show that sub-Saharan countries face few important trade barriers in industrial country markets).

IV. The Managed Trade Alternative

While our assessment (Table 3) of the likelihood of FTAs being negotiated for the major trade flows currently "unaffected" was not positive, this does not suggest that multilateral disciplines are, and will continue to be, binding as far as these flows are concerned. Drawing on trade intervention data for the U.S., Table 4 shows that a high proportion of these major inter-regional trade flows "unaffected" by minilateral trade arrangements take place under "discriminatory" trade barriers reflecting managed trade conditions (particularly VERs) and/or influenced by "unfair trade" laws -- particularly, countervailing duties and antidumping cases.¹⁶ It is also clear from Table 4, that Japan is the main target of U.S. managed trade initiatives. Specifically, some \$68 billion of U.S. imports from Japan are subject to discriminatory measures -- this is more than 13 times the combined imports from Germany, France and the U.K.

As Table 4 suggests, managed trade has a major role in shaping current international trade relations. One should not infer from this data "that rules do not work and more managed trade must, therefore, be the way to go" (Bhagwati (1991, p.23). But an eventual failure, or less than satisfactory outcome, of the Uruguay Round would advance the cause of those who believe that a fix-quantity trading regime is an inevitable development. This could not only impede the rollback of the large array of already existing discriminatory trade barriers, but also foster their use in areas characterized by significant trade dynamism (e.g., high-tech trade).

Advocates of managed trade have used different rationales to justify government intervention. These "rationales," as far as motivations are concerned, can be classified as follows: macroeconomic, systemic, and

¹⁶ The NTBs listed in Table 4 are discriminatory in that they are directed against specific countries whereas other measures, like global quotas or variable import levies, do not differentiate among foreign suppliers. As indicated, the U.S. discriminatory measures are very heavily concentrated on Japan -- particularly Japanese exports of high technology products. The authors have undertaken a separate analysis of EEC discriminatory trade barriers and also found that these restrictions are primarily directed at Japan (results available from the authors on request). With Canada, United States, and Sweden as the combined comparator group our results indicated that over 90 percent of EEC discriminatory protection was directed against Japanese exports. Laird and Yeats (1991) provide additional information on the application of NTBs by major trading nations.

Table 3. Observations on Potential FTA Arrangements Between Specific Trading Partners (Unaffected trade flows over \$50 billion)

Trade Flows	Share of total exports going to the partner (%)		1988 Value of exports (\$mill.)	Share of all FTA unaffected trade (%)	Observations
	1970	1988			
<u>North America and Developed Europe</u>	—	—	<u>202,105</u>	14.5	An <u>unlikely</u> arrangement. The current MTNs stalled due to disputes between these parties and there is no indication they would be easier to address bilaterally. Europe now seems preoccupied with the single Market Initiative and related problems.
North America's exports to Europe	29(43)	21(33)	90,174	6.5	
Europe's exports to North America	9(28)	7(31)	111,931	8.0	
<u>North America and Japan</u>	—	—	<u>139,846</u>	10.0	Wide U.S. deficits and attempts to brand Japan an "unfair" trading partner make this combination <u>unlikely</u> — as do the large number of discriminatory NTBs applied to Japan. A more likely outcome is managed trade.
North America's exports to Japan	9(14)	10(16)	43,162	3.1	
Japan's exports to North America	34	37	96,684	6.9	
<u>North America and Developing South and SE Asia</u>	—	—	<u>134,999</u>	9.7	Persistent U.S. deficits with South and SE Asia, as well as the latter's concentration of exports in "sensitive" sectors make this arrangement <u>difficult</u> . U.S. discriminatory protection also targets SE Asian NICs.
North America's exports to South Asia	7(10)	11(17)	47,446	3.4	
Developing South Asia's exports to Japan	25(31)	29(37)	87,553	6.3	
<u>Japan and Developing South and SE Asia</u>	—	—	<u>112,134</u>	8.0	Developing Asia's reliance on the U.S. export market makes this combination <u>unlikely</u> , not to mention World War II memories. Also, Yeats (1991) shows that Developing South and SE Asia countries have very similar comparative advantage profiles — a point that would make an FTA difficult.
Japan's exports to South Asia	25	25	67,109	4.8	
Developing South Asia's exports to Japan	17(21)	15(19)	45,025	3.2	
<u>Developed Europe and Developing South and SE Asia</u>	—	—	<u>97,856</u>	7.0	South Asia's reliance on the North American market all but <u>precludes</u> this arrangement. SE Asian NICs are often targetted by discriminatory European trade barriers.
Developed Europe's exports to South Asia	3(7)	4(13)	46,316	3.3	
Developing South Asia's exports to Europe	19(24)	17(22)	51,540	3.7	
<u>Japan and Developed Europe</u>	—	—	<u>80,206</u>	5.8	Distance is a negative factor as is Japan's export concentration in sensitive sectors. The fact that Japan's North American exports are nearly twice as great as those to Europe makes this arrangement <u>unlikely</u> .
Japan's exports to Europe	15	21	55,736	4.0	
Developed Europe's exports to Japan	1(4)	2(7)	24,470	1.8	
<u>Developed Europe and Developing Africa</u>	—	—	<u>68,935</u>	5.0	Vast differences in industrialization levels make these combinations very <u>unlikely</u> . There are few sectors where African industry could compete with Europe.
Developed Europe's exports to Africa	5(14)	3(10)	37,614	2.7	
Developing Africa's exports to Europe	68(72)	59(63)	31,321	2.3	
<u>Eastern Europe and Developing Countries</u>	—	—	<u>56,727</u>	4.1	Major Eastern European internal problems, plus a lack of experience in market-oriented relations with developing countries, makes agreements here very <u>unlikely</u> .
Eastern Europe's exports to Developing Countries	13(34)	17(37)	37,479	2.7	
Developing countries exports to Eastern Europe	6(7)	3(5)	19,248	1.4	
<u>Developed Europe and Developing West Asia</u>	—	—	<u>56,460</u>	4.1	Industrialization level and cultural differences make major FTA agreements here <u>unlikely</u> .
Developed Europe's exports to Asia	2(7)	3(10)	36,631	2.6	
Developing West Asia's exports to Europe	44(47)	23(27)	19,829	1.5	
<u>Developed Europe and Developing Americas</u>	—	—	<u>52,729</u>	3.8	Developing America's reliance on the U.S. market all but <u>precludes</u> these arrangements. Also, industrialization level differences are a major negative factor.
Developed Europe's exports to Americas	4(12)	2(7)	28,337	2.0	
Developing America's exports to Europe	32(39)	23(27)	24,392	1.8	

¹ Figures in parentheses exclude the exporting region's intra-trade.

sectoral (or microeconomic). Although, the use of managed trade to pursue macroeconomic objectives does not find many supporters among economists, still, the deterioration of the US current account over the 1980s has led to several proposals -- usually, focusing on the US-Japan bilateral imbalance -- in favor of quantitative trade targets (US House of Representatives 1986; Kissinger and Vance 1988; Prestowitz 1988; Dornbusch, Krugman, and Park 1989). Managed trade is presented in most of these proposals as an instrument to force U.S. trade partners to open their markets. The limitations of this approach to "correct" US current account deficits are well known, yet, supporters claim that the increase in demand for US goods would tend to ease, via a terms-of-trade effect, the impact of a fiscal-induced real income adjustment.

A "systemic" rationale in favor of managed trade, in turn, has been developed by those concerned with the so-called "Japan question" (Bhagwati 1991). According to this perspective -- e.g., Fallows (1989) -- Japanese policies reveal a social (cultural ...) preference for a fix-quantity trade regime instead of a rules-oriented regime. Therefore, the only way to effectively negotiate the opening of the Japanese economy would be by adopting managed trade practices. This rationale is based on the thesis that Japan is an outlier among trading nations -- more precisely, that Japan is a relatively closed economy. To the extent that the accuracy of this proposition remains open to debate, the economic relevance of the systemic argument is also questionable.¹⁷

Sectoral (or microeconomic) rationales, although equally controversial, have provided the most popular arguments used to support managed trade initiatives. In the past, these initiatives were often framed as defensive actions to ease the adjustment of mature industries in the industrialized countries (e.g., the MFA). Accusations of unfair trade practices by dynamic exporters were also a common characteristic of defensive managed trade policies (e.g., steel VRAs negotiated by the US and the EC with Japan and several NICs). More recently, however, the demand for managed trade has become increasingly associated with the aspiration to promote "strategic" industries in order to foster national competitiveness (Tyson 1990). This development, in part, reflects the perception that Japan has successfully targeted "strategic" industries.¹⁸ This perception, reinforced by the

¹⁷ Lawrence (1987), Balassa and Noland (1988), and Dornbusch (1990), for instance, argue that Japan is -- vis-a-vis other OECD countries -- a closed economy. Saxonhouse (1985) and Bhagwati (1991), in turn, dispute this conclusion. For a review of the related literature see Takeuchi (1988) and Srinivasan (1991).

¹⁸ There is no consensus on the precise meaning of the term "strategic industry." Most of the contributions in this area tend to list high sunk costs in R&D, "positive externalities, large economies of scale based on learning by doing, and important upstream and downstream linkages" (Michalski 1991, p. 9) among the typical attributes of strategic industries. As Stevens (1991, p. 98) points out, however, the fundamental issue here is "the fact that many governments [in spite of the non-existence of an accepted working definition] are able to identify what they perceive to be "strategic" industries and are willing to promote them with specific policies."

economic success of a few followers of the Japanese-paradigm -- e.g., Republic of Korea -- has given a new appeal to interventionist trade and industrial policies as far as policymakers are concerned. At the same time, a flurry of theoretical contributions in the context of the so-called "strategic trade theory" have seemingly given a new "respectability" to interventionist policies.¹⁹

In this paper, we simply argue that the major "unaffected" trade flows identified in Table 2 provide fertile ground for further managed trade initiatives. Our analysis reflects the following considerations: (i) currently, high-technology industries are the preferred choice for those who support the "strategic industry" argument -- see Box 3 for a discussion of definitions for high-tech industry and trade; (ii) the relative importance of high-tech trade vis-a-vis global trade flows has increased significantly over the last three decades from about 10 percent in 1965 to 22 percent of world trade in 1989²⁰; (iii) the United States is perceived to be losing competitiveness in high-tech sectors;²¹ (iv) and Japan has assumed a commanding position in high-tech trade. As Table 5 shows the United States ran a \$24 billion trade deficit in high technology trade with Japan in 1989 (the EEC deficit with Japan was \$19 billion) and these products were often the focus of U.S. discriminatory trade restrictions against Japan.

Growing U.S. trade deficits in high-tech trade vis-a-vis Japan and the Asian NICs, together with the perception that their success has been fostered by government intervention, is an additional factor eroding U.S. support for the a non-interventionist approach with respect to high-tech industries. In the EC, the search for European "champions" in high-tech sectors provides another likely source of additional managed trade initiatives against not only East Asian firms, but also U.S. companies.²² There is also a growing recognition that existing multilateral trade disciplines are not sufficient to avoid international trade frictions in high-tech sectors. Accordingly, there have been proposals for drafting a code for innovation policies -- encompassing trade, research

¹⁹ For a review of the strategic trade theory see, for instance, Krugman (1987) and Helpman (1989). For critical analyses see, for instance, Dixit (1987), Bhagwati (1989) and Haberler (1990).

²⁰ See the Appendix for detailed statistics on trade in high-tech products.

²¹ Revealed comparative advantage indices for high-tech trade do not confirm this perception for the 1968-88 period. Yet, the significant increase in competitiveness of Japan and some NICs in terms of high-tech trade in the same period -- see Appendix Table 5 -- may explain the perception of relative US decline.

²² See, for instance, Koopmann and Scharrer (1990).

Table 4. The Incidence of Discriminatory U.S. Trade Barriers on Japan, Federal Republic of Germany, United Kingdom and French Exports, (Trade values are for 1986 and trade barriers are those in place in 1990)

NTB Code	Description	<u>Japan</u>		<u>Fed. Republic of Germany</u>		<u>United Kingdom</u>		<u>France</u>		<u>Affected Trade of all Four Countries</u>	
		<u>Tariff Lines</u>	<u>Value (\$mill.)</u>	<u>Tariff Lines</u>	<u>Value (\$mill.)</u>	<u>Tariff Lines</u>	<u>Value (\$mill.)</u>	<u>Tariff Lines</u>	<u>Value (\$mill.)</u>	<u>Value (\$mill.)</u>	<u>Japan's Share %</u>
1172	Retaliatory duties	3	1,429	7	30	6	4	7	6	1,496	97.3
2510	Anti-dumping duties	83	6,297	16	872	6	473	19	419	8,061	78.1
2520	Countervailing duties	2	139	1	8	4	10	3	11	168	82.7
3230	Quota allocated by country	16	70	7	32	11	10	11	40	152	46.1
3410	Voluntary export restraint	106	27,676	105	810	98	270	93	496	29,252	94.6
3500	MFA restraint agreement	489	1,163	0	0	0	0	0	0	489	100.0
4220	Import monitoring	3	942	4	358	1	—	0	0	1,300	72.5
6310	Anti-dumping investigations	29	29,945	9	633	9	332	3	348	31,258	95.8
6400	Undertaking	<u>2</u>	<u>942</u>	<u>1</u>	<u>3</u>	<u>1</u>	<u>—</u>	<u>1</u>	<u>1</u>	<u>946</u>	<u>99.6</u>
	All Above Measures ²	733	68,603	150	2,746	136	1,099	137	1,321	73,122	93.9

¹ The United States has also employed two additional discriminatory trade measures, namely, voluntary price restraints (primarily against Republic of Korea) and countervailing duty investigations. Neither of these two measures has been used against Japan, Germany, France or the United Kingdom.

² The totals recorded in this row may involve some double counting of discriminatory barriers if two or more of these measures are applied to the same tariff line product. For this reason one should not attempt to relate the value figures shown above to total trade in order to derive an NTB "coverage ratio".

Source: Authors' tabulations using the UNCTAD Data Base on Trade Control Measures and the World Bank SMART system.

Box 3Definitions of High Technology Industries and Trade

High-tech products are usually defined as products for which investment in the creation of knowledge are responsible for a substantial share of their production costs (Krugman 1987). As Kreinin (1987) points out, to define a high-tech sector in terms of its factor inputs -- e.g., the relative intensity of research and development (R & D) investments, or the proportion of scientists and engineers in the labor force -- does not allow one to discriminate between industries characterized by different rates of technological diffusion. These indicators, by being static in nature, reflect the prevailing situation at a given point in time and may provide a distorted picture as time goes by as some industries become less active in technological terms, while new high-tech sectors evolve.

Most of the relevant literature, however, uses some variation of the input criteria in defining high-tech industries. The better known high-tech definitions are reviewed in Hatter (1985). We adopted the definition proposed by Davis (1982), which estimates the technology intensity for any given industry in the United States in terms of the R&D expenditures required to produce a certain manufactured good. This methodology takes into account not only the direct R&D investments made by final producers, but also the indirect R&D expenditures made by suppliers of intermediate goods used in the production of the final good. The "indirect" R&D contribution was estimated by Davis using input-output techniques. Based on the United States Standard Industrial Classification (SIC), industries were ranked according to their R&D intensity and the first ten SIC groups (3-digit classification) were designated as high-tech industries. The industry ranked as number ten had an R&D index 30 percent greater than the industry in eleventh place and more than 100 percent above the average for the manufacturing sector as a whole. In other words, Davis' methodology imposes a much higher standard in terms of R&D intensity than the "above average level" criteria often adopted in the literature.

In order to translate Davis' industry classification into a definition of high-tech trade, we used the concordance between the SIC grouping and the SITC Revision 1 classification proposed by Hatter (1985). Given the imperfect match between SIC and SITC codes, Hatter estimated high-tech weights (the proportion of US high-tech imports and exports in each given SITC group, based on 1975-1977 US trade data) as a way to highlight the relative importance of high-tech products in any given SITC grouping. In preparing our data on high-tech trade, we considered only those SITC groups (at 4-digit level) which presented a high-tech weight greater or equal to 50 percent. Annex tables in this report identify individual hi-tech products and also provide statistics on their trade.

It is worth mentioning that the appropriateness of this methodology relies on the assumption that the use of United States input-output relations and trade patterns for high-tech production does not introduce a perverse bias in the classification.

and development, competition, and foreign direct investment policies, as well as financial market regulation -- at OECD level as a means to promote policy-convergence over the long-run (Ostry 1990; 1991). Such an initiative clearly reflects a desire to create a fix-rule multilateral regime for high-tech industries in order to avoid the proliferation of managed trade initiatives, but the prospects of such a code being implemented in the near future seem dim at best.²³

V. Final Comments

Managed trade initiatives seems to pose a larger threat to the multilateral trade system in a post-Uruguay Round world than new preferential trading blocs. High-tech trade will probably provide the main points of conflict between OECD countries. Accordingly, a growing resort to managed trade solutions appears likely. Such a development, in turn, may increase the danger of trading blocs turning hostile to each other.

If events proceed along these lines, developing countries may have to deal with some unpleasant realities in the 1990s. It is doubtful that minilateralism will be rolled back from its current high profile as far as trade flows are concerned. On the other hand, a further major expansion of minilateral arrangements among industrialized countries -- beyond the arrangements identified in Table 1 -- does not seem to be an immediate threat. Managed trade practices, however, will continue to add strain to the frail multilateral trade system built around the GATT, fostering a power-based system of international economic relations. It is improbable, to say the least, that developing countries could benefit from such development.

²³ It is also worth remembering that a much more immediate threat to the multilateral system remains at large in the context of an eventual "failure" or unsatisfactory conclusion of the Uruguay Round negotiations (Primo Braga 1991). Against this background, the proliferation of country specific discriminatory trade-management initiatives (i.e., VERS, etc.) for high-tech trade seems even more probable.

Table 5. Trends in United States Exports of High-Tech Products to Selected Markets: 1965 to 1989

<u>High Technology Export Facts</u>	<u>1965</u>	<u>1975</u>	<u>1985</u>	<u>1987</u>	<u>1989</u>
<u>Destination of U.S. Exports (\$million)</u>					
Argentina/Brazil/Chile	139	971	1,601	2,459	2,976
European Community ¹	1,434	5,888	18,544	23,481	36,163
Developing South and SE Asia	338	2,063	10,191	13,008	20,083
Japan	324	1,406	6,114	8,019	12,378
World	4,778	21,951	63,368	78,384	110,367
<u>U.S. High-Tech Trade Balance (\$million)</u>					
Argentina/Brazil/Chile	135	883	720	1,295	1,723
European Community	844	3,452	5,968	7,986	17,199
Developing South and SE Asia	300	597	-2,714	-6,878	-8,096
Japan	-101	-1,219	-18,668	-22,186	-24,313
World	3,182	12,059	-2,707	-5,258	-4,444
<u>Hi-Tech Trade Balance As a Share of U.S. High-Tech Exports (%)</u>					
Argentina/Brazil/Chile	97	91	45	53	58
European Community	58	59	32	34	47
Developing South and SE Asia	89	29	-27	-53	-40
Japan	-31	-87	-305	-276	-196
World	66	55	4	-7	2
<u>Hi-Tech Goods as a Share of All U.S. Exports (%)</u>					
Argentina/Brazil/Chile	17	24	36	43	43
European Community	21	26	43	44	47
Developing South and SE Asia	13	21	38	39	37
Japan	16	15	28	29	29
World					
<u>MEMO ITEM: EEC Hi- Tech Trade Performance</u>					
Hi-Tech Exports to Japan (\$million)	108	612	1,678	3,112	3,926
Hi-Tech Trade Balance with Japan (\$million)	22	-1,024	-8,064	-14,615	-18,888
Hi-Tech Balance as a Share of Hi-Tech Exports	-20	-196	-480	-470	-476
Hi-Tech Goods as a Share of All Exports	21	22	22	20	18

¹ The 13 percentage point increase over 1987-89 is largely due to a \$5 billion upsurge in United States aircraft exports.

AnnexList of Major Regional Integration Arrangements

Andean Pact	Bolivia, Colombia, Ecuador, Peru, Venezuela.
ASEAN	Association of South East Asian Nations (Brunei, Indonesia, Malaysia, Philippines, Singapore, Thailand).
CACM	Central American Common Market (Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua).
CARICOM	Caribbean Common Market (Antigua and Barbuda, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent, Trinidad and Tobago).
EC	European Communities (Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, United Kingdom).
ECOWAS	Economic Community of West African States (Benin, Burkina Faso, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo).
EFTA	European Free Trade Association (Austria, Finland, Iceland, Norway, Sweden, Switzerland).
EC-EFTA	A protocol allows for free trade in manufactured goods between these two trading blocks. An agreement for the creation of an European Economic Area (EEA) is being negotiated.
GCC	Gulf Cooperation Council (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates).
LAIA	Latin American Integration Association (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay, Venezuela).
Maghreb Arab	Maghreb Union (Algeria, Libya, Mauritania, Morocco, Tunisia).
MERCOSUR	South Cone's Common Market (Argentina, Brazil, Paraguay, Uruguay)
SADCC-PTA	South African Development Coordination Conference (Angola, Botswana, Lesotho, Mali, Mozambique, Swaziland, Tanzania, Zambia, Zimbabwe) and Preferential Trade Area of Eastern and Southern African States (members of SADCC, minus Angola, plus Burundi, Comoros, Ethiopia, Kenya, Mauritius, Rwanda, Somalia).
UDEAC	Central African Customs and Economic Union (Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea, Gabon).

References

- Aho, C. Michael and J.D. Aronson (1986). Trade Talks: America Better Listen, (New York: Council on Foreign Relations).
- Baker, James (1988). "The Geopolitical Implications of the U.S.-Canada Trade Pact," The International Economy, (January-February).
- Balassa, Bela and M.H. Noland (1988). Japan in the World Economy. (Washington, D.C.: Institute for International Economics).
- Baldwin, Robert E. (1990). "Commentary" in Lawrence and Schultze, op. cit.
- Bhagwati, Jagdish (1989). "Is Free Trade Passe After Ali?" Weltwirtschaftliches Archiv : 3-30.
- Bhagwati, Jagdish (1991). The World Trading System at Risk. (Princeton: Princeton University Press).
- Bhagwati, Jagdish (1992). "Regionalism vs. Multilateralism: An Overview," paper presented at a World Bank/CEPR Conference on "New Dimensions in Regional Integration." (Washington, D.C.: World Bank).
- Dixit, Avinash K. (1987). "Trade Policy: An Agenda for Research," in P.R. Krugman, ed., Strategic Trade Policy and the New International Economics. (Cambridge: The MIT Press).
- Davis, Lester A. (1982) Technology Intensity of U.S. Output and Trade. (Washington, D.C.: U.S. Department of Commerce).
- Dornbusch, Rudiger W. (1990). "Policy Options for Freer Trade: The Case for Bilateralism," in Lawrence and Schultze, op. cit.
- Dornbusch, Rudiger W., Paul Krugman, and Yung Chul Park (1989) Meeting World Challenges: U.S. Manufacturing in the 1990s. (Rochester: Eastman Kodak Company)
- Erzan, Refik and Peter Svedberg (1989). Protection Facing Exports from Sub-Saharan Africa in the EC, Japan and the United States, PPR Working Paper No. 360, (Washington: World Bank).
- Erzan, Refik and Alexander Yeats (1991). Free Trade Agreements with the United States: What's in it for Latin America?, (Washington: World Bank PRE Working Paper No. 827).
- Fallows, James (1989). "Containing Japan," Atlantic Monthly (May): 40-62.
- GATT (1988). Review of Developments in the Trading System, (Geneva: GATT)
- Haberler, Gottfried (1990). "Strategic Trade Policy and the New International Economics: A Critical Analysis," in Ronald W. Jones and Anne O. Krueger, eds., The Political Economy of International Trade: Essays in Honor of Robert E. Baldwin. (Cambridge, Ma: Basil Blackwell).
- Hatter, Victoria L. (1985). U.S. High Technology Trade and Competitiveness. (Washington, D.C.: U.S. Department of Commerce).
- Helpman, Elhanan (1989). "The Noncompetitive Theory of International Trade and Trade Policy," in Proceedings of the World Bank Annual Conference on Development Economics: 193-216.

- Hufbauer, Gary and Jeffrey Schott (1985). Trading for Growth: The Next Round of Trade Negotiations, (Washington: Institute for International Economics).
- Inotai, Andras (1991). Regional Integration Among Developing Countries Revisited. (Washington: World Bank PRE Working Paper No. 643).
- Kissinger, Henry and Cyrus Vance (1988). "Bipartisan Objectives for Foreign Policies," Foreign Affairs 66 (Summer): 899-921.
- Koopmann, Georg and Hans-Eckart Scharrer (1990). "Scenarios of a Common External Trade Policy for the EC After 1992," HWWA-Report No. 84. (Hamburg: Institut für Wirtschaftsforschung).
- Kreinin, Mordechai E. (1987). "Comparative-Advantage and Possible Trade Restrictions in High-Technology Products," in D. Salvatore, ed. The New Protectionist Threat to World Welfare. (New York: North Holland).
- Krugman, Paul (1987). "Strategic Sectors and International Competition," in R.M. Stern, ed., U.S. Trade Policies in a Changing World Economy. (Cambridge, Ma: MIT Press).
- Laird, Sam and Andre Sapir (1987). "Tariff Preferences" in J. Michael Finger and Andrzej Olechowski, eds, The Uruguay Round: A Handbook for the Multilateral Trade Negotiations, (Washington: World Bank).
- Laird, Sam and Alexander Yeats (1991). Quantitative Methods for Trade Barrier Analysis, (London: Macmillan).
- Lawrence, Robert (1987). "Imports in Japan: Closed Markets or Minds," Brookings Papers on Economic Activity 2: 517-48.
- Lawrence, Robert Z. and Charles L. Schultze, eds., (1990). An American Trade Strategy: Options for the 1990s. (Washington, D.C.: The Brookings Institution).
- Michalski, Wolfgang (1991). "Support Policies for Strategic Industries: An Introduction to the Main Issues," in OECD, op. cit.
- OECD, (1991). Strategic Industries in A Global Economy: Policy Issues for the 1990s. (Paris: OECD)
- Ostry, Sylvia (1990). Governments and Corporations in a Shrinking World. (New York: Council on Foreign Relations).
- Ostry, Sylvia (1991). "Beyond the Border: The New International Policy Arena," in OECD, op. cit.
- Patterson, Gardner (1989). "Implications for the GATT and the World Trade System," in Schott, op. cit.
- Prestowitz, Clyde V., Jr. (1988). Trading Places: How We Allowed Japan to Take the Lead, (New York: Basic Books).
- Primo Braga, C.A. (1990). "U.S. Policies and the Prospects for Latin American Economic Integration," in W.Baer and D.C. Coes, eds., United States Policies and the Latin American Economies. (New York: Praeger).
- Primo Braga, C.A. (1991). "The Threat of a Cold Trade War and the Developing Countries," SAIS Review, 11 (Summer-Fall): 53-67.

- Primo Braga, C.A. (1992). "NAFTA and the Rest of the World," in N. Lustig, B. Bosworth, and R. Lawrence, eds. North American Free Trade: Assessing the Impact (Washington, D.C.: Brookings Institution, forthcoming).
- Rozanski, Jerzy and Alexander Yeats (1992). "On the (in) Accuracy of Economic Observations: An Assessment of Trends in the Reliability of International Trade Statistics," paper presented at a Ford Foundation conference Database of Development Analysis, Yale University, New Haven, Connecticut, 15-16 May 1992.
- Saxonhouse, G.R. (1985). "What's Wrong with Japanese Trade Structure" Seminar Discussion paper No. 166, Dept. of Economics, University of Michigan. (Ann Arbor: University of Michigan).
- Schott, Jeffrey, ed., (1989). More Free Trade Areas? (Washington: Institute for International Economics, May).
- Srinivasan, T.N. (1991). "Is Japan an Outlier Among Trading Countries?" in Jaime de Melo and Andre Sapir, eds., Trade Theory and Economic Reform: North, South, and East -- Essays in Honour of Bela Balassa. (Cambridge, Ma.: Basil Blackwell).
- Stevens, Barrie (1991). "Support Policies for Strategic Industries: An Assessment and Some Policy Recommendations," in OECD, op. cit.
- Takeuchi, Kenji (1988). "Does Japan Import Less Than it Should?" PRE Working Paper Series No. 63. (Washington, DC: The World Bank).
- Tyson, Laura D'Andrea (1990). "Managed Trade: Making the Best of the Second Best," in Lawrence and Schultze, op. cit.
- UNCTAD (1989 and 1990). Handbook of International Trade and Development Statistics, (New York: United Nations).
- US House of Representatives. (1986). "Mandatory negotiations and action regarding foreign countries having excessive and unwarranted trade surpluses with the United States" (Gephardt Amendment). H.R. 4800. (Washington, D.C.: House of Representatives).
- Wonnacott, Paul and Mark Lutz (1989). "Is there a Case for Free Trade Areas?" in Jeffrey Schott (ed.), More Free Trade Areas, (Washington: Institute for International Economic, 1989).
- Yeats, Alexander (1982). "Trade and Transport Barriers as Constraints to Asian Regional Integration," Two Decades of Asian Development and Outlook for the 1980s, (Tokyo: Institute for Developing Economies).
- Yeats, Alexander (1991). "China's Foreign Trade and Comparative Advantage: Prospects, Problems and Policy Implications," World Bank Discussion Paper, No. 141, (Washington: World Bank).

Appendix

Statistics on International Trade in High Technology Products

Appendix Table 1. The Relative Importance and Major Sources of High-Tech Products in Global Trade

Year	Share of Hi-Tech in world trade (%)	All Hi-Tech goods	Industrial Countries	Hi-Tech Goods Originating in: of which:				Other Countries
				USA	Japan	EC(10)	EFTA	
				(Value of exports in terms of \$US million)				
1965	10	17	17	5	1	9	2	--
1970	14	38	36	10	4	18	2	2
1975	12	94	88	22	10	45	6	6
1980	13	233	211	51	30	106	13	22
1985	19	296	269	63	53	114	15	27
1987	20	432	372	78	76	175	25	60
1989	22	557	479	110	97	218	31	78
(Share of Hi-tech trade originating in different regions - (%))								
1965	--	100	100	29	6	53	6	--
1970	--	100	95	26	10	47	5	8
1975	--	100	94	23	11	48	6	6
1980	--	100	91	22	13	45	6	9
1985	--	100	88	21	18	38	5	9
1987	--	100	86	18	18	40	6	14
1989	--	100	86	20	18	39	6	14

Source: Based on data derived from the UNSO Comtrade Data Base. The failure of some countries to report trade statistics to the United Nations may cause the value of trade in hi-tech products to be misstated.

Appendix Table 2. The Origin and Destination of High Tech Trade in 1988

Exporter	Destination of Exports												
	World	All Industrial	of which:				of which:						
			EC(12)	EFTA	North America	Japan	All Developing	Latin America	South Asia	East Asia	Others	Eastern Europe	Not Specified
(value of exports in terms of US\$ millions)													
World	507.5	372.6	204.9	32.4	103.2	18.4	114.7	18.8	5.5	64.6	25.8	8.8	20.2
Industrial Countries	445.4	334.0	192.7	31.2	82.5	15.3	93.9	17.1	4.1	49.1	23.6	6.8	17.5
EEC(12)	210.7	171.7	120.8	21.3	21.2	4.0	27.7	3.3	1.8	8.1	14.5	4.5	11.3
EFTA	30.0	24.3	16.4	3.8	2.7	0.8	3.8	0.6	0.2	1.0	1.9	1.3	1.9
North America	110.5	73.6	32.8	3.6	22.3	10.4	33.7	11.1	1.2	16.4	5.0	0.2	3.2
Japan	92.8	63.6	22.3	2.5	36.0	0.0	28.2	2.0	0.9	23.1	2.2	0.8	1.0
Developing Countries	60.8	38.3	12.0	1.1	20.6	3.1	20.6	1.7	1.3	15.4	2.2	1.2	1.9
Latin America and Caribbean	4.8	3.1	0.8	0.1	1.9	0.1	1.7	1.2	-	0.3	0.1	-	0.0
South Asia	0.9	0.3	0.2	-	0.1	-	0.3	-	-	0.1	0.1	0.3	0.0
East Asia	49.3	32.3	9.4	0.8	17.8	2.9	16.8	0.3	0.8	14.6	1.0	0.2	0.2
Others	5.7	2.8	1.6	0.1	0.9	0.1	1.9	0.2	0.5	0.3	0.9	0.6	1.0
(Share of exports to different destinations - percents)													
World	100	73	40	6	20	4	23	4	1	13	5	2	4
Industrial Countries	100	75	43	7	19	3	21	4	1	11	5	2	4
EEC(12)	100	81	57	10	10	2	13	2	1	4	7	2	6
EFTA	100	81	55	13	9	3	13	2	1	3	6	4	6
North America	100	67	30	3	20	9	30	10	1	15	5	-	3
Japan	100	69	24	3	39	0	31	2	1	25	2	1	1
Developing Countries	100	63	20	2	34	5	34	3	2	25	4	2	3
Latin America and Caribbean	100	65	17	2	40	2	35	25	-	6	2	-	0
South Asia	100	34	22	-	11	-	33	-	-	11	11	33	0
East Asia	100	66	19	2	36	6	34	1	2	30	2	-	-
Others	100	49	28	2	16	2	33	4	9	5	16	11	18

Source: UNCTAD Comtrade Data Base.

Appendix Table 3. The Twenty-Five Largest Exporters of High Tech Manufactured Goods

<u>Exporter</u>	<u>Trade balance (\$million)</u>			<u>Share of world exports (%)</u>			<u>Value of exports (\$million)</u>		
	<u>1968</u>	<u>1978</u>	<u>1988</u>	<u>1968</u>	<u>1978</u>	<u>1988</u>	<u>1968</u>	<u>1978</u>	<u>1988</u>
United States	3,891	12,130	8,716	29.2	21.2	18.5	7,413	31,882	94,734
Japan	1,417	16,454	71,315	8.5	13.7	17.5	2,173	20,607	89,694
Germany, Fed.	1,969	6,752	9,170	14.9	14.0	10.8	3,768	21,017	55,499
France	46	-124	-1,296	6.6	6.9	6.6	1,684	10,458	34,009
United Kingdom	1,132	2,812	-5,669	9.5	7.8	6.3	2,415	11,736	32,007
Netherlands	38	-110	-2,861	5.1	4.7	3.9	1,287	7,090	19,827
Taiwan, (China)	-104	873	7,623	0.4	1.7	3.2	99	2,563	16,595
Italy	161	-307	-6,803	4.5	3.7	3.2	1,148	5,609	16,247
Rep. of Korea	-176	-584	4,263	0.1	1.0	2.9	17	1,544	14,682
Belgium-Luxembourg	-55	-221	-1,209	2.9	3.5	2.7	730	5,219	13,954
Canada	-610	-1,453	-3,437	4.3	2.9	2.7	1,087	4,423	13,717
Singapore	-103	-570	1,697	0.1	0.9	2.4	16	1,380	12,531
Switzerland	-27	847	-70	2.8	2.7	1.9	704	4,018	9,692
Hong Kong	-151	-698	-5,004	0.6	0.9	1.6	148	1,392	8,369
Sweden	-273	-405	-1,027	1.9	1.7	1.5	480	2,581	7,589
Mexico	-355	-443	804	0.4	0.9	1.4	96	1,339	7,112
Malaysia	-51	-293	770	--	0.6	1.2	3	885	6,044
Austria	-591	-1,354	-5,566	0.7	1.1	1.1	170	1,585	5,874
Ireland	-75	-140	1,477	0.3	0.6	1.1	67	844	5,618
China	45	-262	-2,570	0.2	0.2	1.1	41	262	5,394
Spain	-310	-1,039	-7,041	0.4	0.7	0.8	100	1,034	4,020
Denmark	-203	-845	-1,420	0.8	0.7	0.7	194	1,119	3,486
Brazil	-389	-1,318	-1,001	0.1	0.5	0.6	26	728	3,106
Australia	-592	-1,355	-5,566	0.5	0.8	0.6	123	1,218	2,978
Thailand	-152	-598	-1,330	--	0.1	0.4	2	214	1,941
All above countries	4,482	27,749	56,533	94.6	93.5	94.7	23,991	140,747	484,719
World	--	--	--	100.0	100.0	100.0	25,349	150,569	511,886

Source: UNSO Comtrade Data Base.

Appendix Table 4. The Relative Importance of Individual Products in All High Tech Global Exports

SITC	Description	Share in All Hi-Tech Product Exports (%)		Value of exports in \$ million					
		1968	1988	1968	1973	1978	1983	1987	1988
714	Office Machinery	8.6	18.4	2,279	7,235	15,071	34,408	77,857	93,168
724	Telecommunications Apparatus	12.3	11.5	3,246	9,568	22,741	30,972	53,094	58,363
861	Scientific Instruments	9.0	9.4	2,393	6,112	14,754	20,773	35,859	47,673
729.3	Transistors, Photocell, etc.	3.1	8.7	819	3,987	8,458	17,838	33,997	44,288
734	Aircraft	13.5	7.9	3,558	6,298	14,079	24,831	32,633	39,967
581.2	Products of Polymerization	5.9	7.6	1,549	4,814	10,706	16,594	20,600	38,742
711.5	Internal Combustion Engines	7.4	5.6	1,963	4,661	11,367	15,119	24,028	28,425
541	Medicinal Products Excluding Pharmaceuticals	7.1	5.5	1,888	4,698	10,526	15,030	24,950	27,993
729.9	Electrical Machinery and Apparatus	3.2	3.5	847	2,590	6,421	8,323	15,165	17,836
891.1	Tape Recorders	2.8	3.1	743	1,983	3,843	9,995	16,742	15,768
581.1	Plastics and Products of Condensation	3.2	2.4	840	2,210	4,710	7,063	13,549	12,303
513	Inorganic Elements	3.8	2.3	1,000	2,585	5,823	8,596	10,435	11,468
711.4	Aircraft Engines	4.1	2.2	1,082	1,898	3,036	4,912	9,603	11,226
862	Photographic Supplies	2.4	2.1	625	1,532	3,840	5,933	9,600	10,516
891.2	Recorders of Sound	0.8	1.9	206	642	1,756	4,168	8,716	9,794
651.6	Synthetic Fibers	4.7	1.7	1,231	3,559	4,884	5,973	9,387	8,800
514	Other Inorganic Chemicals	2.5	1.3	649	1,324	3,014	4,249	6,043	6,730
515	Radioactive Materials	0.3	1.0	85	489	3,005	3,971	5,348	5,192
711.6	Gas Turbines	0.5	0.5	139	417	2,240	3,805	4,307	5,002
533.1	Coloring Materials	0.6	0.5	162	387	742	1,016	2,265	2,620
541.9	Pharmaceutical Goods	0.3	0.4	85	215	564	884	1,754	2,268
651.7	Yarn and Artificial Fibers	1.0	0.4	258	607	941	1,113	1,706	2,238
899.6	Orthopedic Appliances	0.2	0.4	43	148	532	811	1,349	1,998
561.3	Potassic Fertilizers	1.1	0.3	292	432	861	1,204	1,220	1,647
711.8	Engines, nes	0.4	0.3	113	274	540	815	1,198	1,468
711.3	Steam Engines	0.9	0.2	231	486	1,206	1,267	1,229	1,201
894.3	Nonmilitary Arms	0.2	0.1	61	158	239	241	323	333
571.4	Hunting and Sporting Ammunition	0.1	—	32	74	155	145	358	237
571.2	Fuses and Detonators	—	—	18	34	95	88	151	153
729.7	Electron Accelerators	—	—	12	15	37	52	77	84
Memo Item									
Hi-Tech as a Share of All Manufactures Exports (%)				21.0	21.4	21.5	25.6	27.2	28.6

Appendix Table 5. Revealed Comparative Advantage Indices for the Twenty-Five Largest Exporters of High-Tech Manufactured Goods

Exporter	1968	1978	1988
United States	1.56	1.56	1.59
Japan	1.05	1.16	1.33
Germany, Fed.	0.91	0.89	0.76
France	0.96	0.91	1.03
United Kingdom	1.00	1.10	1.19
Netherlands	1.37	1.27	1.15
Taiwan, (China)	0.98	1.05	1.01
Italy	0.74	0.59	0.55
Rep. of Korea	0.30	0.74	1.00
Belgium-Luxembourg	0.62	0.77	0.69
Canada	0.87	0.84	0.75
Singapore	0.49	2.07	2.23
Switzerland	1.05	0.86	0.75
Hong Kong	0.48	0.67	0.75
Sweden	0.70	0.75	0.69
Mexico*	1.53	1.73	1.34
Malaysia	0.37	2.35	1.98
Austria	0.63	0.82	0.84
Ireland	0.92	1.40	1.64
China	0.28	0.28	0.48
Spain	0.72	0.51	0.53
Denmark	0.84	0.82	0.78
Brazil	0.70	0.96	0.65
Australia	1.05	1.99	1.56
Thailand	0.27	0.98	0.85

Note: The Revealed Comparative Advantage (RCA) index is defined as follows:

$$RCA_{ij} = (x_{ij}/X_{tj})/(x_{iw}/X_{tw})$$

where the w subscripts indicate world totals, t represents all manufactured goods, x_i denotes a certain category of manufactured exports (in this case high-tech goods), and j is a country. Values above unity are taken to indicate that the country has a comparative advantage in high-tech products. The figures presented in this table were calculated by the authors based on the UNSO Comtrade Data Base.

(a) The data for Mexico includes the exports from the "maquila" plants.

Policy Research Working Paper Series

	Title	Author	Date	Contact for paper
WPS948	Factors Affecting Private Financial Flows to Eastern Europe, 1989-91	Mohua Mukherjee	July 1992	R. Lynn 32169
WPS949	The Impact of Formal Finance on the Rural Economy of India	Hans Binswanger Shahidur Khandker	August 1992	H. Binswanger 31871
WPS950	Service: The New Focus in International Manufacturing and Trade	Hans Jürgen Peters	August 1992	A. Elcock 33743
WPS951	Piecemeal Trade Reform in Partially Liberalized Economies: An Evaluation for Turkey	Glenn W. Harrison Thomas F. Rutherford David G. Tarr	August 1992	D. Ballantyne 38004
WPS952	Unit Costs, Cost-Effectiveness, and Financing of Nutrition Interventions	Susan Horton	August 1992	O. Nadora 31091
WPS953	The "Pedigree" of IEC Conversion Factors for Per Capita GNP Computations for the World Bank's Operational Guidelines and <i>Atlas</i>	Michael Hee	August 1992	E. Zamora 33706
WPS954	How OECD Policies Affected Latin America in the 1980s	Chris Allen David Currie T. G. Srinivasan David Vines	August 1992	T. G. Srinivasan 31288
WPS955	OECD Fiscal Policies and the Relative Prices of Primary Commodities	George Alogoskoufis Panos Varangis	August 1992	D. Gustafson 33714
WPS956	Regression Estimates of Per Capita GDP Based on Purchasing Power Parities	Sultan Ahmad	August 1992	E. O'Reilly-Campbell 33707
WPS957	Carbon Taxes, the Greenhouse Effect, and Developing Countries	Anwar Shah Bjorn Larsen	August 1992	WDR Office 31393
WPS958	EC Bananarama 1992: The Sequel — The EC Commission Proposal	Brent Borrell Maw-Cheng Yang	August 1992	A. Kitson-Walters 33712
WPS959	Waterborne Diseases in Peru	Sheila Webb and Associates	August 1992	WDR Office 31393
WPS960	Agricultural Pricing and Environmental Degradation	Edward B. Barbier Joanne C. Burgess	August 1992	WDR Office 31393
WPS961	Economic Development and the Environment: Conflict or Complementarity?	Wilfred Beckerman	August 1992	WDR Office 31393
WPS962	Do Markets Underprice Natural-Resource Commodities?	Margaret E. Slade	August 1992	WDR Office 31393

Policy Research Working Paper Series

	Title	Author	Date	Contact for paper
WPS963	Growth and Welfare Losses from Carbon Emissions Restrictions: A General Equilibrium Analysis for Egypt	Charles R. Blitzer R. S. Eckaus Supriya Lahiri Alexander Meeraus	August 1992	WDR Office 31393
WPS964	Toxic Releases by Manufacturing: World Patterns and Trade Policies	Robert E. B. Lucas	August 1992	WDR Office 31393
WPS965	Coping with the Disappointing Rates of Return on Development Projects That Affect the Environment	William Ascher	August 1992	WDR Office 31393
WPS966	Trade and the Environment: A Survey of the Literature	Judith M. Dean	August 1992	WDR Office 31393
WPS967	Transition Problems in Economic Reform: Agriculture in the Mexico-U.S. Free Trade Agreement	Santiago Levy Sweder van Wijnbergen	August 1992	M. Stroude 38831
WPS968	Biomass	David O. Hall	August 1992	WDR Office 31393
WPS969	Imports, Exports, and Industrial Performance in India, 1970-88	M. Ataman Aksoy Helena Tang	August 1992	M. Shore 31129
WPS970	Political Models of Macroeconomic Policy and Fiscal Reform	Alberto Alesina	August 1992	E. Khine 39361
WPS971	The Effects of Democratic Determination of Wages: Theory and Evidence from Self-Managed Firms	Milan Vodopivec	August 1992	CECTM 37188
WPS972	Commercial Energy Efficiency and the Environment	Robin W. Bates Edwin A. Moore	September 1992	WDR Office 31393
WPS973	How Changes in the Former CMEA Area May Affect International Trade in Manufactures	Refik Erzan Christopher Holmes	September 1992	G. Ilogon 33732
WPS974	How Multilateral Trading Arrangements May Affect the Post-Uruguay Round World	C. A. Primo Braga Alexander Yeats	September 1992	J. Jacobson 33710